

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant: Nobuharu ISHIKAWA et al.
Title: DISPLACEMENT SENSOR
Appl. No.: Unassigned
Filing Date: 11/30/2001
Examiner: Unassigned
Art Unit: Unassigned

PRELIMINARY AMENDMENT

Commissioner for Patents
Box PATENT APPLICATION
Washington, D.C. 20231

Sir:

Prior to examination of the above-identified application, Applicants respectfully request that the following amendments be entered into the application:

In the Claims:

In accordance with 37 CFR §1.121, please substitute for original claims 14, 16, 18, 29 and 30 the following rewritten versions of the same claims, as amended. The changes are shown explicitly in the attached "Version With Markings to Show Changes Made."

14. (Amended) A displacement sensor according to claim 1, wherein further comprising an illuminator for illuminating a measurement position on the measurement object and a surrounding region, the controller being adapted to turn on the illuminator under the observation mode.

16. (Amended) A displacement sensor according to claim 1, wherein the image acquiring optical system comprises an oblique image acquiring optical system for capturing an image by viewing the measurement position of the measurement object and a surrounding region from an oblique angle, and a frontal image acquiring optical

system for capturing an image by viewing the measurement position of the measurement object and the surrounding region from the front; and

the two dimensional imaging device comprises a two dimensional oblique image imaging device for photoelectrically converting an image obtained via the oblique image acquiring optical system and a two dimensional frontal image imaging device for photoelectrically converting an image obtained via the frontal image acquiring optical system;

the controller under the measurement mode being adapted to compute a desired displacement according to a video signal from the two dimensional oblique image imaging device while the controller under the observation mode is adapted to display the measurement point of the measurement object and the surrounding region according a video signal from the two dimensional frontal image imaging device.

18. (Amended) A displacement sensor according to claim 1, wherein the image acquiring optical system comprises an oblique image acquiring optical system for capturing an image by viewing the measurement position of the measurement object and a surrounding region from an oblique angle, and a frontal image acquiring optical system for capturing an image by viewing the measurement position of the measurement object and the surrounding region from the front;

the two dimensional imaging device is used commonly for the two image acquiring optical systems.

29. (Amended) A sensor head for an optical displacement sensor according to claim 25, further comprising shutter means for selectively shutting off one of a first light path reaching the two dimensional imaging device via the oblique image acquiring optical system and a second light path reaching the imaging device via the frontal image acquiring optical system in an alternative manner either manually or remotely.

30. (Amended) A sensor head for an optical displacement sensor according to claim 25, further comprising an illuminator for illuminating a measurement position of a measurement object and a surrounding region.

REMARKS

Applicants respectfully request that the foregoing amendments to Claims 14, 16, 18, 29 and 30 be entered in order to avoid this application incurring a surcharge for the presence of one or more multiple dependent claims.

Respectfully submitted,

By



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VERSION WITH MARKINGS TO SHOW CHANGES MADE

14. (Amended) A displacement sensor according to [any one of claims 1 to 12] claim 1, wherein further comprising an illuminator for illuminating a measurement position on the measurement object and a surrounding region, the controller being adapted to turn on the illuminator under the observation mode.

16. (Amended) A displacement sensor according to [any one of claims 1 to 13] claim 1, wherein the image acquiring optical system comprises an oblique image acquiring optical system for capturing an image by viewing the measurement position of the measurement object and a surrounding region from an oblique angle, and a frontal image acquiring optical system for capturing an image by viewing the measurement position of the measurement object and the surrounding region from the front; and

the two dimensional imaging device comprises a two dimensional oblique image imaging device for photoelectrically converting an image obtained via the oblique image acquiring optical system and a two dimensional frontal image imaging device for photoelectrically converting an image obtained via the frontal image acquiring optical system;

the controller under the measurement mode being adapted to compute a desired displacement according to a video signal from the two dimensional oblique image imaging device while the controller under the observation mode is adapted to display the measurement point of the measurement object and the surrounding region according a video signal from the two dimensional frontal image imaging device.

18. (Amended) A displacement sensor according to [any one of claims 1 to 13] claim 1, wherein the image acquiring optical system comprises an oblique image acquiring optical system for capturing an image by viewing the measurement position of the measurement object and a surrounding region from an oblique angle, and a frontal image acquiring optical system for capturing an image by viewing the measurement position of the measurement object and the surrounding region from the front;

the two dimensional imaging device is used commonly for the two image acquiring optical systems.

29. (Amended) A sensor head for an optical displacement sensor according to [any one of claims 25 to 28] claim 25, further comprising shutter means for selectively shutting off one of a first light path reaching the two dimensional imaging device via the oblique image acquiring optical system and a second light path reaching the imaging device via the frontal image acquiring optical system in an alternative manner either manually or remotely.

30. (Amended) A sensor head for an optical displacement sensor according to [any one of claims 25 to 28] claim 25, further comprising an illuminator for illuminating a measurement position of a measurement object and a surrounding region.